Chromatic Number of the Plane: Breakthroughs and Further Aspirations

Alexander Soifer, University of Colorado at Colorado Springs, asoifer@uccs.edu

The year 2018 has seen magnificent breakthroughs in my favorite open problem of mathematics. The British biologist Aubrey de Grey created the first ever 5-chromatic unit-distance graph on 20425 vertices, and the race for the smallest such example commenced. Following de Grey's reduction to a graph on 1581, Marijn Heule of the Netherlands set 6 world records, ending with a graph on merely 533 vertices. These remarkable results were the first improvements in general case since the 18-year old Edward Nelson created this problem 68 years ago. What is next? What do these mathematicians, as well as Geoffrey Exoo and Dan Ismailescu work on? What are the aspirations, which we usually call conjectures? Come and join this discussion.

These and other important results obtained in the past few years, inspired Springer to sign a contract with this presenter on the second expanded edition of "The Mathematical Coloring Book," birth of which is expected in 2020.